

Amendments to the Specification

The paragraph starting at page 1, line 5 and ending at line 12 has been amended as follows.

The present invention relates to an image forming apparatus, such as a copying machine, a printer, a ~~facsimile~~ facsimile machine, etc., which forms an image with the use of one of the electrophotographic methods. In particular, it relates to an image forming apparatus comprising a single or plurality of circuit boards having a single or plurality of heat generating portions.

The paragraph starting at page 1, line 13 and ending at page 2, line 10 has been amended as follows.

In an image forming apparatus such as a copying machine, a printer, and or a ~~facsimile~~ facsimile machine, an image is electrophotographically formed, in other words, with the use of a charging means for charging a photosensitive member, a developing means for forming an image of toner, a transferring means for transferring the image formed of toner a onto recording medium, a fixing means for fixing the unfixed image formed of toner on the recording medium to the recording medium, etc. Generally, an image forming apparatus is equipped with various circuit boards, for example, a circuit board having a current conversion circuit for converting the alternating current from a commercial power source, into direct current in order to supply the charging means and the like with direct current, and a circuit board having a control circuit for sending signals from a CPU (central processing unit) to various processing means. These circuit boards, that is, the current conversion circuit board, control circuit board, etc., are separately mounted in an image forming apparatus, according to their roles. Further, they are structured so that

they can be placed in vertical alignment in order to minimize the spaces they occupy in the main assembly of an image forming apparatus.

The paragraph starting at page 2, line 11 and ending at line 19 has been amended as follows.

Placing these circuit boards in vertical alignment, as described above, so that air is allowed to flow between the adjacent two boards creates a problem in that the heat generated by the electric current flowing through the circuit on the circuit board on the under side underside heats the circuit boards on the top side, reducing thereby the services service lives of the electrical components on the circuit boards on the top side.

The paragraph starting at page 2, line 20 and ending at page 3, line 9 has been amended as follows.

Japanese Laid-open Patent Application 2,000-216580 2000-216580 discloses one of the solutions to this problem. According to this patent, a duct positioned between a circuit board and the heat source located below the circuit board is increased in thermal conductivity to more efficiently recover the heat from the heat source, in order to reduce the amount by which the heat from the heat source transfer transfers to the circuit board above the heat source.

The paragraph starting at page 4, line 18 and ending at page 5, line 9 has been amended as follows.

If this structural arrangement disclosed in Japanese Laid-open Patent Application 11-186770 is simply adapted to an image forming apparatus in which circuit boards are placed in vertical alignment, the heat from the circuit board(s) on the bottom side must be exhausted through the circuit board(s) on the top side, along with the heat from the circuit board(s) on the top side. In other words, the heat from the circuit boards on the bottom side transfer to the circuit boards on the top side, ~~heating~~ thereby heating the circuit board(s) on the top side. In other words, the circuit board(s) on the top side are adversely affected by the heat from the circuit board(s) on the bottom side. In order to prevent this problem, it is desired that an image forming apparatus is structured so that the heat from the circuit board(s) on the bottom side is directly exhausted from the apparatus, that is, without being transferred through the ~~in the~~ circuit board(s) on the top side.

The paragraph starting at page 6, line 1 and ending at line 3 has been amended as follows.

~~an a~~ hole positioned on the top side of the first circuit board and open to the ambience of the apparatus; and

The paragraph starting at page 6, line 16 and ending at line 20 has been amended as follows.

Figure 1 is a schematic drawing showing the positioning of the components of the image forming apparatus in the first embodiment of the present invention, Figure 1(a) and Figure 1(b) being the rear and side view views, respectively.

The paragraph starting at page 6, line 27 and ending at page 7, line 4 has been amended as follows.

Figure 4 is a schematic drawing showing the positioning of the components of the image forming apparatus in the second embodiment of the present invention, Figure 4(a) and Figure 4(b) being the rear and side view views, respectively.

The paragraph starting at page 8, line 23 and ending at page 9, line 2 has been amended as follows.

The sheet P is picked up by a pickup roller 105, and is sent to a pair of separation rollers 106. Then, it is conveyed to a pair of registration roller rollers 108 by a pair of vertical path rollers 107, and is released by the registration rollers 108 with a predetermined timing to be conveyed to the secondary transfer station.

The paragraph starting at page 9, line 3 and ending at line 16 has been amended as follows.

The image forming apparatus in Figure 3 comprises a rotary type color developing apparatus 4, which is structured to integrally hold a plurality of monochromatic developing apparatuses, that is, a yellow (Y) developing apparatus 4Y, a cyan (C) developing apparatus 4C, and a magenta (M) developing apparatus 4M, which ~~uses~~ use two-component toner. The black developing apparatus ~~4k~~ 4K uses single component toner, and therefore, does not yield development waste. Thus, it can be independently positioned from the other developing apparatuses in order to make it easier to use the image forming apparatus in the monochromatic (black) mode, which is greater in usage frequency than the multicolor mode.

The paragraph starting at page 11, line 17 and ending at line 25 has been amended as follows.

The duct 5 is also provided with an air passage 5b which runs between the rear panel 9, which is a part of the image forming apparatus main frame, and the control circuit board 3. Thus, not only does the duct 5 ~~plays~~ play the role of creating airflow in the main assembly, but also ~~functions~~ function as a heat exhaustion duct for exhausting the body of air having been heated by the heat from the fixing apparatus 101 of the image forming means.

The paragraph starting at page 15, line 3 and ending at line 13 has been amended as follows.

Further, ~~since~~ the partitioning member, or the airflow deflecting member 6, is diagonally positioned, making the air passage gradually widen toward the air vent 85. This tilting of the partitioning member 6 increases the air exhaustion efficiency, because of the natural convection of the warm (heated) air, that is, the natural upward movement of warm (heated) air. As a result, the body of warmer air from the inner part of the apparatus main assembly is drawn toward the air vent along the partitioning member 6.

The paragraph starting at page 15, line 14 and ending at line 18 has been amended as follows.

It is possible that this airflow deflecting member 6 will eventually become warm and ~~transfers~~ transfer heat to the control circuit board. Therefore, the airflow deflecting member 6 is desired to be formed of a thermally insulating substance such as resin.

The paragraph starting at page 17, line 1 and ending at line 5 has been amended as follows.

The shapes of the holes of the ~~above-described~~ above-described air intake and air vents are to be determined in consideration of the electrical noises and external design of the image forming apparatus, and are not to be limited to those shown in Figure 2.

The paragraph starting at page 21, line 5 and ending at line 16 has been amended as follows.

In this embodiment, the wall of the duct 5 is provided with a hole, which is on the power source circuit board 4 side, as shown in Figure 5. Further, the power source circuit board 4 is provided with a an airflow deflecting member 6. Therefore, the airflow induced upwardly by the heat from the power source circuit board 4 is guided into the duct 5 located between the control circuit board 3 and power source circuit board 4, and is made to join the airflow in the duct 5, so that it will be exhausted from the apparatus main assembly along with the airflow in the duct 5.

The paragraph starting at page 21, line 17 and ending at line 25 has been amended as follows.

In the case of the ~~above-described~~ above-described setup, a pressure difference occurs between the strong airflow induced by the axial fan 7 located in the duct 5, and the airflow induced by the heat from the power source circuit board 4, in adjacencies of where the edge of the airflow deflecting member 6 is projecting into the duct 5, and this pressure difference acts to draw the airflow induced by the heat from the power source circuit board 4, into the duct 5.